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EXAMINER

NGUYEN, TU MINH

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,204	Applicant(s) YOKOI ET AL.	
	Examiner TU M. NGUYEN	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-17, 20, 23, 24, 27 and 32-34 is/are rejected.
- 7) ☒ Claim(s) 18, 19, 21, 22, 25, 26 and 28-31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. An Applicant's Amendment filed on December 19, 2008 has been entered. Claims 13, 23, 33, and 34 have been amended. Overall, claims 13-34 are pending in this application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 13-16, 23, and 32-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Harndorf et al. (PCT Publication No. WO 02/38932) (see U.S. Patent 6,948,311 for the English equivalence).

Re claims 33-34, as shown in Figures 1-3, Harndorf et al. disclose a regeneration controller and a method for eliminating particulate matter accumulated in an exhaust purification apparatus (particulate filter (115b)) that is arranged in an exhaust system (110) of an internal combustion engine (100), the regeneration controller comprising:

- a heating section (step 230) for heating the exhaust purification apparatus to eliminate the particulate matter accumulated in the exhaust purification apparatus when an estimated accumulation amount is greater than a reference accumulation amount (step 210 with positive answer), wherein the heating section obtains the estimated accumulation amount by estimating

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the amount of particulate matter accumulated in the exhaust purification apparatus (see lines 1-18 of column 5); and

- a mode change section for changing exhaust purification apparatus heating modes (from a first phase to a second phase and to a third phase as claimed in claims 1-4) when heating the purification apparatus if the estimated accumulation amount is within a mode change range (in Harndorf et al., when a filter loading exceeds a threshold value, a quality of uncombusted fuel is increased over time to increase a filter temperature, when a determination is made that the regeneration of the filter has just begun, a second phase where the quantity of supplied uncombusted fuel is constant, is ended, and a third phase where the quantity of uncombusted fuel is intermittently supplied, begins; wherein the determination is based on a change in the estimated accumulation amount estimated by a change in differential pressure across the filter (see at least line 43 of column 6 to line 14 of column 7)), wherein:

- an exhaust having an air-fuel ratio flows in the exhaust system;
- the mode change range is set in accordance with a comparatively small estimated accumulation amount (when a determination that the regeneration of the filter has just begun (i.e., when the downstream temperature of the filter is greater than the upstream temperature or the differential pressure across the filter is reduced by a predetermined value), only a small amount of particulate matter in the filter is combusted); and

- the mode change section changes the heating mode when the estimated accumulation amount is within the mode change range from a normal heating mode (second phase), for slowly burning the particulate matter in the exhaust purification apparatus by continuously keeping the air-fuel ratio in the exhaust system low, to a burn-up heating mode (third phase), for burning up

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the particulate matter accumulated in the exhaust purification apparatus at once by intermittently lowering the air-fuel ratio in the exhaust system so that a temperature of a catalyst bed is elevated so that the temperature of the catalyst bed is higher in the burn-up heating mode than in the normal heating mode (see at least claims 1 and 3, lines 46-57 of column 4, and lines 22-25 of column 7),

wherein in the burn-up heating mode (third phase), the amount of fuel repeatedly added, the period of fuel addition, and the period when fuel is not added are set so as to realize activated oxygen state and exhaust temperatures at upstream and downstream sides of the exhaust purification apparatus capable of burning up the particulate matter accumulated in the exhaust purification apparatus (during third phase, a fuel is intermittently injected so as to adjust an oxygen state of exhaust gas in the filter in order to keep the combustion under control and therefore, to maintain the filter under regeneration within a desired temperature range).

Re claims 13 and 23, as shown in Figures 1-3, Harndorf et al. disclose a regeneration controller and a method for eliminating particulate matter accumulated in an exhaust purification apparatus (particulate filter (115b)) that is arranged in an exhaust system (110) of an internal combustion engine (100), the regeneration controller comprising:

- a heating section (step 230) for heating the exhaust purification apparatus to eliminate the particulate matter accumulated in the exhaust purification apparatus when an estimated accumulation amount is greater than a reference accumulation amount (step 210 with positive answer), wherein the heating section obtains the estimated accumulation amount by estimating the amount of particulate matter accumulated in the exhaust purification apparatus (see lines 1-18 of column 5); and

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- a mode change section for changing exhaust purification apparatus heating modes (from a first phase to a second phase and to a third phase as claimed in claims 1-4) when heating the purification apparatus if the estimated accumulation amount is within a mode change range (in Harndorf et al., when a filter loading exceeds a **threshold value**, a quality of uncombusted fuel is increased over time to increase a filter temperature, when a determination is made that the regeneration of the filter has just begun, a second phase where the quantity of supplied uncombusted fuel is constant, is ended, and a third phase where the quantity of uncombusted fuel is intermittently supplied, begins; wherein the determination is based on a change in the estimated accumulation amount estimated by a change in differential pressure across the filter (see at least line 43 of column 6 to line 14 of column 7)), wherein:

- an exhaust having an air-fuel ratio flows in the exhaust system;
- the mode change range is set in accordance with a comparatively small estimated accumulation amount (when a determination that the regeneration of the filter has just begun (i.e., when the downstream temperature of the filter is greater than the upstream temperature or the differential pressure across the filter is reduced by a predetermined value), only a small amount of particulate matter in the filter is combusted); and

- the mode change section changes the heating mode when the estimated accumulation amount is within the mode change range and less than or equal to a normal burn-up start determination value (a “normal burn-up start determination value” is the **threshold value** indicated above) (the third phase is started when a differential pressure across the filter begins to decrease from the threshold value, which indicates a small amount of particulate matter in the filter has been combusted), which is slightly greater than an end determination value, from a

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normal heating mode (second phase), for slowly burning the particulate matter accumulated in the exhaust purification apparatus by continuously keeping the air-fuel ratio in the exhaust system low, to a burn-up heating mode (third phase), for burning up the particulate matter accumulated in the exhaust purification apparatus at once by intermittently lowering the air-fuel ratio in the exhaust system so that a temperature of a catalyst bed is elevated so that the temperature of the catalyst bed is higher in the burn-up heating mode than in the normal heating mode (see at least claims 1 and 3, lines 46-57 of column 4, and lines 22-25 of column 7).

Re claims 14-16, the regeneration controller of Harndorf et al. further comprises a difference detection unit for detecting at least one of an exhaust pressure difference and an exhaust temperature difference between an upstream side and a downstream side of the exhaust purification apparatus, in which the exhaust purification apparatus (115b) is a downstream side one of at least two exhaust purification apparatuses (115a, 115b) arranged in the exhaust system; wherein the mode change section determines whether to change the heating mode to the burn-up heating mode based on at least one of the exhaust pressure difference and the exhaust temperature difference detected by the pressure detection unit (see line 43 of column 6 to line 14 of column 7).

Re claim 32, in the regeneration controller of Harndorf et al., the mode change section determines if the estimated accumulation amount is within the mode change range, and changes the heating mode when the estimated accumulation amount is within the mode change range, from the normal heating mode to the burn-up heating mode (Harndorf et al. utilize a differential pressure sensor to detect a small change in soot accumulation amount in order to determine when soot burning begins (see lines 4-9 of column 7)).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17, 20; 24; and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harndorf et al. as applied to claims 14; 15; and 16, respectively, above, in view of Tashiro et al. (U.S. Patent 6,622,480).

Re claims 17, 24, and 27, the regeneration controller of Harndorf et al. discloses the invention as cited above, however, fails to disclose that the mode change section increases the estimated accumulation amount and continues the burn-up heating mode when the exhaust pressure difference or the exhaust temperature difference detected by the difference detection unit is greater than a mode change reference value.

As shown in Figures 1 and 8, Tashiro et al. disclose a diesel particulate filter unit (4) and a regeneration control method of said unit. As indicated in step S15 of Figure 9, Tashiro et al. teach that it is conventional in the art to compute an incremental amount of particulate matter removed during a regeneration step of the filter unit and increase a total amount of removed particulate matter until a remaining amount is equal to a minimum value when such regeneration is deemed completed. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Tashiro et al. in the controller of

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Harndorf et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to effectively regenerate a particulate filter.

Re claim 20, in the modified regeneration controller of Harndorf et al., as taught by Tashiro et al., the mode change section limits the number of times for increasing the estimated accumulation amount to a reference number of times or less.

Allowable Subject Matter

6. Claims 18, 19, 21, 22, 25, 26, and 28-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

7. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

In response to applicant's argument that Harndorf et al. fail to disclose a mode change section that changes the heating mode when the estimated accumulation amount is within the mode change range and less than or equal to a normal burn-up start determination value (pages 10-11 of the Applicant's Amendment), the examiner respectfully disagrees.

In Harndorf et al., during a normal lean operation of the engine, a particulate filter (115b) is allowed to accumulate particulate matter in an exhaust gas stream. When an estimated accumulation amount is greater than a reference accumulation amount (**threshold value**) (step 210 with positive answer), a heating section (step 230) for heating the particulate filter to eliminate the particulate matter accumulated in the filter is initiated. During the heating section,

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a mode change section changes the heating mode when the estimated accumulation amount is within the mode change range and less than or equal to a normal burn-up start determination value (a “normal burn-up start determination value” is the **threshold value** indicated above) (in Harndorf et al., when a filter loading exceeds a **threshold value**, a quality of uncombusted fuel is increased over time during a first phase and a second phase to increase a filter temperature; when a determination is made that the regeneration of the filter (i.e., the actual burning of particulate matter is initiated) has just begun (emphasis added), a second phase where the quantity of supplied uncombusted fuel is constant, is ended, and a third phase where the quantity of uncombusted fuel is intermittently supplied, begins; wherein said determination is based on a small decrease in the estimated accumulation amount estimated by a small change in differential pressure across the filter (see at least line 43 of column 6 to line 14 of column 7)). Thus, Harndorf et al. clearly disclose a mode change section that changes the heating mode when the estimated accumulation amount is within the mode change range and less than or equal to a normal burn-up start determination value.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Communication

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMN

March 13, 2009

/Tu M. Nguyen/

Tu M. Nguyen

Primary Examiner

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